

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A shape measurement system for measuring a three-dimensional shape of an object, comprising:

a picture taking part taking a picture of the object;

a projecting part applying light having a predetermined pattern onto the object;

a picture taking position specifying part detecting a position at which said picture taking part takes the picture of the object, and generating position information specifying the position;

a three-dimensional coordinate calculating part calculating a three-dimensional coordinate of each point of the object ~~in accordance with~~ based on the position information and an image taken at the position specified by the position information; and

a three-dimensional shape composing part expressing ~~the each point~~ by a coordinate in a single coordinate system, ~~a and generating a composite image in accordance with at least two three-dimensional coordinates~~ coordinate of each point of the object calculated ~~for the each point~~ by said three-dimensional coordinate calculating part ~~based on respective images obtained as a result of the picture of the object on which the light having the predetermined pattern is applied being taken from~~ for at least two different positions, and to produce a composed image.

Claim 2 (Original): The shape measurement system as claimed in claim 1, further comprising:

a picture taking control part controlling operation timing of said picture taking part;

a signal converting part converting an analog signal obtained by said picture taking part into a digital signal; and

a storing part storing the digital signal, three-dimensional coordinate and composite image.

Claim 3 (Original): The shape measurement system as claimed in claim 2, further comprising an interpolation part performing interpolation processing on at least one of the image obtained by said picture taking part and the composite image obtained by said three-dimensional shape composing part.

Claim 4 (Original): The shape measurement system as claimed in claim 1, further comprising a three-dimensional image generating part generating a three-dimensional image of the object in accordance with coordinates of the object obtained by said three-dimensional coordinate calculating part and an image obtained when the light having the predetermined pattern is not applied to the object by said picture taking part.

Claim 5 (Currently Amended): A shape measurement system for measuring a three-dimensional shape of an object, comprising:

a plurality of picture taking parts with different optical centers taking pictures of the object;

a projecting part applying light having a predetermined pattern onto the object;

a picture taking position specifying part detecting positions at which said plurality of picture taking parts take the picture of the object, and generating position information specifying the respective positions;

a three-dimensional coordinate calculating part calculating a three-dimensional coordinate of each point of the object for each image ~~in accordance with~~ based on a plurality of images obtained as a result of pictures of the object being taken by said plurality of picture

taking parts, and the position information generated by said picture taking position specifying part; and

a three-dimensional shape composing part expressing ~~the each point~~ by a coordinate in a single coordinate system, ~~a and generating a composite image in accordance with the plurality of three-dimensional coordinates for the each point~~ coordinate of each point of the object calculated by said three-dimensional coordinate calculating part for at least two different positions, and to produce a composed image.

Claim 6 (Original): The shape measurement system as claimed in claim 5, further comprising:

a plurality of picture taking control parts controlling operation timing of said plurality of picture taking parts, respectively;

a plurality of signal converting parts converting analog signals obtained by said plurality of picture taking parts into digital signals, respectively; and

a storing part storing the digital signals obtained by said plurality of signal converting parts, three-dimensional coordinate calculated by said three-dimensional coordinate calculating part and composite image generated by said three-dimensional shape composing part.

Claim 7 (Currently Amended): A shape measurement system for measuring a three-dimensional shape of an object, comprising a picture taking device taking a picture of an object and a computer:

wherein:

said picture taking device comprises:

a projecting part applying light having a predetermined pattern onto the object; and

a picture taking position specifying part detecting a position at which said picture taking part takes the picture of the object, and generating position information specifying the position; and

said computer comprises:

a three-dimensional coordinate calculating part calculating a three-dimensional coordinate of each point of the object ~~in accordance with~~ based on the position information and an image obtained as a result of the picture being taken at the position specified by the position information; and

a three-dimensional shape composing part expressing ~~the each point~~ by a coordinate in a single coordinate system, ~~and generating a composite image in accordance with at least two a three-dimensional coordinates~~ coordinate of each point of the object calculated ~~for the each point~~ by said three-dimensional coordinate calculating part ~~based on respective images obtained as a result of the picture of the object on which the light having the predetermined pattern is applied being taken from~~ for at least two different positions, and to produce a composed image.

Claim 8 (Original): The shape measurement system as claimed in claim 7, wherein said computer further comprising an interpolation part performing interpolation processing on the plurality of three-dimensional coordinates calculated by said three-dimensional coordinate calculating part.

Claim 9 (Original): The shape measurement system as claimed in claim 7, wherein at least one of said projecting part and picture taking position specifying part is controlled by said computer.

Claim 10 (Original): A picture taking device comprising a picture taking part taking a picture of an object, and further comprising:

a projecting part applying light having a predetermined pattern onto the object;

a picture taking position specifying part detecting a position at which said picture taking part takes the picture of the object, and generating position information specifying the position; and

a storing part storing an image obtained as a result of the picture of the object on which the light having the predetermined pattern is applied being taken by said picture taking part, and the position information.

Claim 11 (Original): The picture taking device as claimed in claim 10, wherein at least one of said projecting part and said picture taking position specifying part is controlled by a control signal provided externally.

Claim 12 (Original): The picture taking device as claimed in claim 10, wherein said picture taking part also takes a picture of the object onto which the light having the predetermined pattern is not applied.

Claim 13 (Currently Amended): A shape measurement method of measuring a three-dimensional shape of an object, comprising the steps of:

a) applying light having a predetermined pattern onto the object;

b) detecting a position at which said step a) takes the picture of the object, and generating position information specifying the position;

c) calculating a three-dimensional coordinate of each point of the object ~~in accordance~~ with based on the position information and an image obtained as a result of the picture being taken at the position specified in said step b); and

d) expressing ~~each point~~ by a coordinate in a single coordinate system ~~in accordance~~ with ~~at least two a three-dimensional coordinates~~ coordinate of each point of the object calculated for ~~each point~~ in said step c) ~~based on respective images obtained as a result of picture of the object on which the light having the predetermined pattern is applied being taken from~~ for at least two different positions in said step a), and producing a composed image.

Claim 14 (Original): The method as claimed in claim 13, further comprising the step of:

e) generating a three-dimensional image of the object in accordance with coordinates of the object in the coordinate system, and an image of the object obtained in said step a) when the light having the predetermined is not applied thereonto.

Claim 15 (Currently Amended): A shape measurement method of measuring a three-dimensional shape of an object, comprising the steps of:

- a) applying light having a predetermined pattern onto the object;
- b) taking pictures of the object through a plurality of picture taking parts having different optical centers;
- c) detecting positions at which said plurality of picture taking parts take the pictures of the object, and generating position information specifying the positions, respectively;
- d) calculating a three-dimensional coordinate of each point of the object for each image ~~in accordance with~~ based on a plurality of images obtained as a result of pictures of the

object on which the light of the predetermined is applied being taken by said plurality of picture taking parts, and the position information generated in said step c); and

e) ~~expressing the each point~~ by a coordinate in a single coordinate system ~~in accordance with the plurality of~~ for each point of the object a three-dimensional coordinates ~~of each point~~ coordinate calculated in said step d) for at least two different positions, and producing a composed image.

Claim 16 (Currently Amended): A computer readable recording medium in which a program for measuring a three-dimensional shape of an object through a computer, said program causing the computer to:

calculate a three-dimensional coordinate of each point of the ~~object in accordance with~~ based on an image obtained as a result of a picture of the object on which light having a predetermined pattern is applied being taken, and position information specifying a position at which the picture of the object is thus taken; and

~~express the each point~~ by a coordinate in a single coordinate system ~~in accordance with at least two~~ a three-dimensional coordinates coordinate for each point of the object calculated ~~for each point based on respective images obtained as a result of picture of the object on which the light having the predetermined pattern is applied being taken from~~ at least two different positions, and to produce a composed image.

Claim 17 (Currently Amended): The computer readable recording medium as claimed in claim 16, wherein said program causes

an acceleration sensor to generate the position information specifying the position with respect to the gravitation; and

a ~~magnetic~~ magnetic sensor to generate the position information specifying the position with respect to the terrestrial magnetism.

Claim 18 (Original): The computer readable recording medium as claimed in claim 16, wherein said program causes an angular velocity sensor to detect a rotational angular velocity around each coordinate axis of the three-dimensional coordinate system.

Claim 19 (Original): The computer readable recording medium as claimed in claim 16, wherein said program further causes the computer to generate a three-dimensional image of the object in accordance with the coordinates of the object in the single coordinate system, and an image of the object obtained through taking picture of the object on which the light having the predetermined is not applied.

Claim 20 (Currently Amended): A computer readable recording medium for measuring a three-dimensional shape of an object through a computer, said program causing the computer to:

calculate a three-dimensional coordinate of each point of the object for each image ~~in accordance with~~ based on a plurality of images obtained as a result of pictures of the object on which the light of the predetermined is applied being taken by a plurality of picture taking parts, and position information specifying positions at which the pictures of the object are taken by the plurality of picture taking parts; and

express ~~the each point~~ by a coordinate in a single coordinate system ~~in accordance with the thus-calculated~~ a three-dimensional coordinate coordinate for the each point of the object, for at least two different positions, and to produce a composed image.



Claim 21 (New): The shape measurement system as claimed in claim 1, wherein the three-dimensional shape composing part calculates a rotation component applied for producing the composed image based on respective attitude angles from which the images are taken from the different positions.

Claim 22 (New): The shape measurement system as claimed in claim 1, wherein the three-dimensional shape composing part finds corresponding points among the images taken from the different positions, and calculates a translation component applied for producing the composed image.

Claim 23 (New): The shape measurement system as claimed in claim 5, wherein the three-dimensional shape composing part calculates a rotation component applied for producing the composed image based on respective attitude angles from which the images are taken from the different positions.

Claim 24 (New): The shape measurement system as claimed in claim 5, wherein the three-dimensional shape composing part finds corresponding points among the images taken from the different positions, and calculates a translation component applied for producing the composed image.

Claim 25 (New): The shape measurement system as claimed in claim 7, wherein the three-dimensional shape composing part calculates a rotation component applied for producing the composed image based on respective attitude angles from which the images are taken from the different positions.

Claim 26 (New): The shape measurement system as claimed in claim 7, wherein the three-dimensional shape composing part finds corresponding points among the images taken from the different positions, and calculates a translation component applied for producing the composed image.

Claim 27 (New): The method as claimed in claim 13, wherein the expressing d) calculates a rotation component applied for producing the composed image based on respective attitude angles from which the images are taken from the different positions.

Claim 28 (New): The method as claimed in claim 13, wherein the expressing d) finds corresponding points among the images taken from the different positions, and calculates a translation component applied for producing the composed image.

Claim 29 (New): The method as claimed in claim 15, wherein the expressing d) calculates a rotation component applied for producing the composed image based on respective attitude angles from which the images are taken from the different positions.

Claim 30 (New): The method as claimed in claim 15, wherein the expressing d) finds corresponding points among the images taken from the different positions, and calculates a translation component applied for producing the composed image.

Claim 31 (New): The computer readable recording medium as claimed in claim 16, wherein the program causing the computer to express further calculates a rotation component applied for producing the composed image based on respective attitude angles from which the images are taken from the different positions.

Claim 32 (New): The computer readable recording medium as claimed in claim 16, wherein the program causing the computer to express further finds corresponding points among the images taken from the different positions, and calculates a translation component applied for producing the composed image.

Claim 33 (New): The computer readable recording medium as claimed in claim 30, wherein the program causing the computer to express further calculates a rotation component applied for producing the composed image based on respective attitude angles from which the images are taken from the different positions.

Claim 34 (New): The computer readable recording medium as claimed in claim 30, wherein the program causing the computer to express further finds corresponding points among the images taken from the different positions, and calculates a translation component applied for producing the composed image.

IN THE DRAWINGS

The attached sheet of drawings includes changes to Fig. 3. This sheet, which includes Fig. 3, replaces the original sheet including Fig. 3.

Replacement Fig. 3 properly spells the term “Three-Dimensional” in steps S3 and S5.

Attachment: Replacement Sheet